

AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)



**FOR
PAVEMENTS AND CONSTRUCTION EQUIPMENT OPERATOR
(3E2X1)**

**MODULE 19
SWEEPERS**

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Career Field Education and Training Plan (CFETP) references from 5 August 2002 version.

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Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

**AIR FORCE QUALIFICATION TRAINING PACKAGES
FOR
PAVEMENTS AND CONSTRUCTION EQUIPMENT OPERATOR
(3E2X1)**

INTRODUCTION

Before starting this AFQTP, refer to and read the [“AFQTP Trainer/Trainee Guide.”](#)

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on **core** and **diamond tasks** for upgrade training. ***It is important for the trainer and trainee to understand*** that an AFQTP ***does not*** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:

AFQTP completion
Hands-on certification

Diamond task:

AFQTP completion
CerTest completion (80% minimum to pass)

Note: *Trainees will receive hands-on certification training for Diamond Tasks when equipment becomes available either at home station or at a TDY location.*

Put this package to use. Subject matter experts under the direction and guidance of HQ AFCESA/CEOF revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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MULTI-PURPOSE SWEEPERS

MODULE 19

AFQTP UNIT 3

PERFORM OPERATIONAL CHECKS (19.3.1.)

PERFORM OPERATOR MAINTENANCE (19.3.2.)

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

PERFORM OPERATIONAL CHECKS AND OPERATOR MAINTENANCE ON MULTI-PURPOSE SWEEPERS

Task Training Guide

STS REFERENCE NUMBER/TITLE:	19.3.1. - Perform operational checks on multi-purpose sweepers. 19.3.2. - Perform operator maintenance on multi-purpose sweeper.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-2, Lesson 011 – 013. 2. Technical Order (TO) 36C25-2-32-11, TYMCO, MODEL 600, Operators Manual. 3. Air Force Joint Manual (AFJMAN) 24-306, Manual for the Wheeled Vehicle Driver. 4. AF Form 1806, Operator's Inspection Guide and Trouble Report (Aircraft Towing, Base Maintenance Deicers, High Reach and Snow Removal). 5. Owner's manual. 6. Local procedures.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess a minimum of a 3E231 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit2 Section 2-2 Lesson 011 - 013. 2.2. TO 36C25-2-32-11. 2.3. AFJMAN 24-306, Chapter 1, page 1-6; <i>Driver Responsibilities</i> and Chapter 15, page 15-1; <i>Inspections and Preventive Maintenance.</i> 2.4. AF Form 1806. 2.5. Owner's manual. 2.6. Local procedures.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Multi-purpose sweeper. 2. Personal protective equipment. 3. General tool kit. 4. AF Form 1806.
Learning Objective:	The trainee will be able to properly check out a multi-purpose sweeper.
Samples of Behavior:	The trainee will demonstrate how to perform operational checks and operator maintenance on a multi-purpose sweeper.
Notes:	<ol style="list-style-type: none"> 1. Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety glass/goggles). 2. Any safety violation is an automatic failure.

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PERFORM OPERATIONAL CHECKS AND OPERATOR MAINTENANCE ON MULTI-PURPOSE SWEEPERS

1. Background. There are several types of vacuum sweepers used by the Air Force. Specific pre-operational inspection procedures for each type can be found in the owner's manual that accompanied the equipment. It is important that this equipment is properly checked and serviced prior to operation. This ensures the equipment will get the job done effectively and as efficiently as possible. The primary sweeper used by the Air Force is the TYMCO Model 600 with standard pick-up head. The TYMCO sweeper is a multipurpose sweeper, capable of performing both flight line and street sweeping. The design of the TYMCO 600 allows it to maintain cleaner surfaces at higher rate of speeds with lower maintenance costs than other larger, more complex sweepers. It is mounted on a heavy-duty truck chassis and uses an auxiliary engine and blower assembly to operate the sweeper system. In this AFQTP, we will focus our discussion on the TYMCO 600 sweeper with standard pick-up head.

NOTE:

If your unit has a different type of sweeper than TYMCO, you must review the owner manual for that type of sweeper.

2. Maintenance Safety. When servicing the sweeper, keep safety in mind at all times. The following are only a few items to be aware of when servicing the sweeper. Always use operator manual safety checklist.

- 2.1. All jewelry must be removed to prevent it from getting caught in moving parts or grounding out the battery.
- 2.2. When working around the battery, wear eye protection and gloves.
- 2.3. Always be aware of hot engine parts and liquids such as coolant and hydraulic fluid.
- 2.4. Always turn off the auxiliary engine before doing any work on the pick-up head.
- 2.5. Never remove the pressure or suction tubes while the auxiliary engine is running.

3. Operational and Maintenance Procedures. Follow these steps to perform operational checks and operators maintenance on a multi-purpose sweeper:

3.1. Operational Checks.

Step 1: Utilizing AF Form 1806

- 1.1. Check all the items listed that pertain to the multipurpose sweeper.
- 1.2. Sign AF Form 1806 after properly inspecting equipment.

Step 2: Inspect Vehicle Exterior. Inspection of the vehicle exterior begins with a 360-degree walk around looking for damage and leaks.

- 2.1. Check the tires for wear, lug nut tightness, rear hub leaks, and correct tire air pressure.
- 2.2. Check the mirrors for cleanliness and cracks.
- 2.3. Check the hopper for any damage.
- 2.4. Note any discrepancies on the AF form 1806 and notify supervisor.

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HINT:

Puddles of fluid and dirty areas on the engine or ground normally indicate problem areas and should be investigated and repaired prior to operation.

Step 3: Check Drive Engine / Battery Compartments.

- 3.1. Check the engine oil, coolant, brake, power steering, and transmission fluid for proper levels and fill as needed.
- 3.2. Inspect the drive belts for wear, tension, and alignment.
- 3.3. Ensure the battery connections are secure and free from corrosion.

Step 4: Inspect Auxiliary Engine.

- 4.1. Check the engine oil, fuel, and coolant for proper levels and fill as needed
- 4.2. Inspect the drive belts for wear, tension, and alignment.
- 4.3. Ensure battery connections are secure and free from corrosion.
- 4.4. Inspect the exhaust system to ensure it is not damaged or loose.

Step 5: Inspect Sweeper Unique Items. The following items are unique to TYMCO 600 sweeper and not listed on the AF Form 1806; add these items in the spaces provided for additional items.

- 5.1. Check the gutter brooms for wear and adjustment.
- 5.2. Examine the seals on the hopper and inspection doors for proper seal, dry rot, and damage.
- 5.3. Check the pick-up head for damage.
- 5.4. Ensure the water system's nozzles, filters, and screens are free from dirt and debris.
- 5.5. Ensure the dust separator screen is not damaged and close the inspection/rear doors.
- 5.6. Inspect the hand suction hose for dry rot or any damage to the hose or metal tube.
- 5.7. Check Blower and Suction hose for wear and damage.

3.2. Operator's Daily Maintenance. Operator maintenance is required to ensure the sweeper is properly lubricated, serviced, and adjusted for maximum performance.

Step 1: Check fuel level / refuel. Refueling it at the end of each working day prevents moisture from condensing and forming droplets within the fuel tank.

Step 2: Check and service air intake breathers.

- 2.1. Air intake breathers are of special importance. They should not be clogged with dirt or dust.
- 2.2. If they are clogged, they need to be cleaned to operator manual requirements/ replaced as required.

Step 3: Ensure all fluids are at the correct level. Add coolant to the radiator(s), fill the crankcase with correct oil, and fill the batteries as needed.

Step 4: Check and replace any broken lenses and burnt out bulbs.

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Step 5: Check tires for proper air pressure.

- 5.1. Add air to the tires if they are low.
- 5.2. If a tire is damaged or worn take it to transportation maintenance for replacement.
- 5.3. Ensure all lug nuts are tightened.

Step 6: Clean sweeper by washing and wax.

- 6.1. Wash sweeper and inside hopper.
- 6.2. Leave hopper and inspection doors open after cleaning to air dry.
- 6.3. DO NOT wash the inside of the cab, this shortens the life of the vehicle cab and causes the floor mats to deteriorate and the floorboards to rust.

NOTE:

If sweeper is painted with a flat paint DO NOT WAX!!!

Step 7: Check and replace the gutter broom bristles when they are worn to within 5 inches or less. (See Unit 3, Change Brooms.)

Step 8: Clean around the gutter broom hydraulic motor shafts.

Step 9: Adjust the gutter brooms and pick-up head as necessary (use the operators manual for technical guidance on how to adjust these items).

**REVIEW QUESTIONS
FOR
PERFORM OPERATIONAL CHECKS AND OPERATOR MAINTENANCE ON MULTI-
PURPOSE SWEEPERS**

QUESTION	ANSWER
1. The drive belt inspection is required on the drive engine only.	a. True. b. False.
2. Which of the following is not an inspection item performed on both the drive and auxiliary engine compartments?	a. Oil. b. Leaks. c. Coolant. d. Brake Fluid.
3. Which AF Form is the vehicle inspection guide that should be used to inspect the multipurpose sweeper?	a. AF Form 171. b. AF Form 373. c. AF Form 1800. d. AF Form 1806.
4. The gutter brooms should be inspected for wear and adjustment during the pre-operational inspection.	a. True. b. False.

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PERFORM OPERATIONAL CHECKS AND OPERATOR MAINTENANCE ON MULTI-PURPOSE SWEEPER

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....	YES	NO
Operational Checks		
1. utilize AF Form 1806?		
2. check tires for wear, lug nut tightness, and air pressure?		
3. check mirrors for damage?		
4. check for damage to truck and hopper?		
5. check the engine oil, coolant, brake, power steering, and transmission fluid levels and fill as needed?		
6. check the drive belts for wear, tension, and alignment?		
7. check the battery connections to ensure they were secure and free of corrosion?		
8. check the auxiliary engine oil, fuel, and coolant levels and fill as needed?		
9. check the auxiliary engine drive belts for wear, tension, and alignment?		
10. check the auxiliary engine battery connections to ensure they were secure and free of corrosion?		
11. check the auxiliary engine exhaust system?		
12. check the gutter brooms for wear and adjustment?		
13. check the seals on hopper and inspect doors?		
14. check pick-up head?		
15. check and clean water system's nozzles, filters, and screens?		
16. check dust separator screen and close inspection/rear door?		
17. check hand suction hose for dry rot and damage?		
18. sign AF Form 1806?		
19. comply with all safety requirements?		
Operator's Daily Maintenance		
1. check the fuel level and refueled if needed?		
2. check and service air intake breathers?		
3. check fluids levels (coolant, oil, batteries) and fill as needed?		
4. check and replace (if needed) broken lenses and burnt out bulbs?		
5. check tires?		
6. clean the vehicle?		
7. check and clean gutter broom if needed?		
8. clean around the gutter broom hydraulic motor shafts?		
9. check and adjust gutter brooms and pick-up head if needed?		
10. comply with all safety requirements?		

FEEDBACK: Trainer/Certifier should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer/certifier.

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MULTI-PURPOSE SWEEPERS

OPERATE ON:

MODULE 19

AFQTP UNIT 3

STREET (19.3.2.2.)

THIS UNIT IS **OPTIONAL** AND AVAILABLE TO USE AS A LESSON PLAN WHEN TRAINING ON THIS NON-CORE TASK.

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OPERATE ON STREET
Task Training Guide

STS Reference Number/Title:	19.3.3.2. – Operate (multi-purpose sweeper) on street.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Pavements and Construction Equipment Operator Journeyman 3E251B Volume 1, Unit 2-2, Section 2 Lessons 011 - 013. 2. Technical Order (TO) 36C25-2-32-11, TYMCO, MODEL 600, Operators Manual. 3. Air Force Joint Manual (AFJMAN) 24-306, Manual for the Wheeled Vehicle Driver. 4. AF Form 1806, Operator's Inspection Guide and Trouble Report (Aircraft Towing, Base Maintenance Deicers, High Reach and Snow Removal). 5. Owner's manual. 6. Local procedures.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess a minimum of a 3E231 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-2, Lessons 011 - 013. 2.2. TO 36C25-2-32-11. 2.3. AFJMAN 24-306, Chapter 1, page 1-6; <i>Driver Responsibilities</i> and Chapter 15, page 15-1; <i>Inspections</i>. 2.4. AF Form 1806. 2.5. Owner's manual. 2.6. Local procedures.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Multi-purpose sweeper. 2. Personal protective equipment. 3. AF Form 1806.
Learning Objective:	The trainee will be able to operate a multipurpose sweeper on base streets.
Samples of Behavior:	The trainee will demonstrate how to properly operate a multipurpose sweeper on base streets.
Notes:	
<ol style="list-style-type: none"> 1. Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety glass/goggles). 2. Any safety violation is an automatic failure. 3. This unit is <u>optional</u> and available to use as a lesson plan when training on this non-core task. 	

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OPERATE ON STREET

1. Background. The Air Force has always had a policy to maintain high standards of cleanliness. To maintain these high standards, base streets and parking lots must be swept on a regular basis. Where does most of the litter on any base end up? It ends up on the street against the curb. Sweeping litter and keeping streets and parking lots clean, improves morale of base personnel, helps prevent illness, and keeps the base looking nice.

2. Sweeping Operations. Street conditions and type of debris are the two major factor determining sweeping speeds. Be sure to watch for parked vehicles and debris. Pay special attention to uneven road surfaces, potholes, pedestrians, and other heavy objects that may damage the pick-up head. When sweeping curbs and gutters, steering accuracy is very important. Damage can be avoided by sweeping with the bristles 1 to 2 inches (25.4mm to 50.8mm) up the face of the curb.

2.1. During operation, varying debris loads may require changes to the blower revolution per minute (rpm). Check owner manual for proper speed and blower rpm's for the type of pick-up head that is used.

2.2. As you are sweeping, you may encounter large objects such as large rocks, crates, wood, or boxes that will not fit under the pickup head. You need to, stop the sweeper, idle blower rpm's, and pick up the object, and deposit the object in the hopper through the right or left side inspection door. Another area of concern is sweeping through standing water or over wet pavement. This will not damage the sweeper, but you need to be conscious of the fact that the sweeper has the ability to remove water from the surface rapidly. Therefore it may require frequent dumping to remove the water from the hopper.

NOTE:

On new TYMCO models there is a water relief valve that will allow water to leave the hopper without having to stop sweeping operation.

NOTE:

DO NOT drive in reverse with your pickup head in the down position. This will cause damage to the drag links and possibly the pickup head itself.

3. Operating Procedures. Follow these steps to operate multi-purpose sweeper on streets:

Step 1: Perform pre-operational inspection. (Refer to Module 19, Unit 3; Perform Operational and Operators Maintenance.)

Step 2: Start the truck (drive) engine. Ensure parking brake is set and transmission is in neutral or park depending on the year model.

Step 3: Turn on safety flashers and beacon.

Step 4: Start auxiliary engine. Set engine speed at idle.

SAFETY:

PICK-UP HEAD SHOULD ALWAYS BE GROUNDED IF ENGINE IS ABOVE IDLE.

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Step 5: Lower pick-up head to pavement, and then pull forward 2-3 feet (0.61m to 0.91m)

Step 6: Increase blower revolution per minute (RPM) to the desired setting. Use owner manual for amount/type of debris being swept.

Step 7: Engage gutter broom(s). Save wear and tear on gutter booms by only using when cleaning gutter.

Step 8: Utilize water system.

8.1. To turn on the water system:

8.1.1. Engage the main water system switch.

8.1.2. Press the prime button.

8.1.3. Engage the water switch desired (pick-up head, gutter brooms, and/or hopper).

8.2. Use the water spray system to control dust when sweeping in dusty conditions.

HINT:

Do not use the water system in freezing weather conditions.

Step 9: Start sweeping.

Step 10: General shutdown procedures.

10.1. If gutter brooms are used, raise them, and pull forward 4 to 6 feet (1.22 m to 1.83m). This action allows the debris kicked under the sweeper to be removed by the pickup head.

10.2. Decrease the auxiliary engine RPM, raise the pick-up head, turn off the water system, and shut down the auxiliary engine after 3 to 5 min at idle.

10.3. Drive the sweeper to another area that needs to be swept or if completed sweeping operation go to dump site and empty hopper/ then travel to the wash area for cleaning. (Refer to Unit 3, Perform Cleaning Operations.)

SAFETY:

SAFETY FLASHERS AND BEACON MUST BE ON AT ALL TIMES WHEN SWEEPING OR TRAVELING.

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**REVIEW QUESTIONS
FOR
OPERATE ON STREET**

QUESTION	ANSWER
1. What is the first step in sweeping operations?	a. Pre-operational check. b. Lower pick-up head to ground. c. Start the engine. d. Turn on water system.
2. Never use the water system when sweeping if weather is _____?	a. foggy. b. raining. c. freezing. d. windy.
3. How long must you allow the auxiliary engine to idle before shutting down?	a. 1 to 2 min. b. 2 to 4 min. c. 3 to 5 min. d. 6 to 8 min.
4. Safety flashers and beacon must be on when traveling in the sweeper.	a. True. b. False.

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OPERATE ON STREET

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....	YES	NO
1. perform an operational inspection by utilizing AF Form 1806? (Refer to Unit 3, Perform Operational Checks and Operator Maintenance.)		
2. sign AF Form 1806?		
3. start the engine correctly?		
4. turn on the safety flashers and beacon?		
5. start the auxiliary engine correctly?		
6. lower the pick-up head and pulled forward 2 to 3 feet?		
7. increase the blower setting to recommended rpm?		
8. engage the gutter broom(s)?		
9. engage the water system, (if temperature is above 32°)?		
10. shutdown the sweeper correctly?		
11. comply with all safety requirements?		

FEEDBACK: Trainer/Certifier should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer/certifier.

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MULTI-PURPOSE SWEEPERS

MODULE 19

AFQTP UNIT 3

CHANGE BROOMS (19.3.4.)

MAKE ADJUSTMENTS TO BROOM (19.3.6.2.)

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CHANGE BROOMS / MAKE ADJUSTMENTS TO BROOM

Task Training Guide

STS Reference Number/Title:	19.3.4. - Change brooms on multi-purpose sweeper. 19.3.6.2. - Make adjustments to broom.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-1, Lesson 013; <i>Operator Adjustments on the TYMCO Air Sweeper</i>. 2. Technical Order (TO) 36C25-2-32-11, TYMCO, MODEL 600, Operators Manual. 3. Air Force Joint Manual (AFJMAN) 24-306, Manual for the Wheeled Vehicle Driver. 4. AF Form 1806, Operator's Inspection Guide and Trouble Report (Aircraft Towing, Base Maintenance Deicers, High Reach and Snow Removal). 5. Owner's manual. 6. Local procedures.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess a minimum of a 3E231 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-1 Lesson 013. 2.2. TO. 36C25-2-32-11. 2.3. AFJMAN 24-306, Chapter 1, page 1-6; <i>Driver Responsibilities</i>. 2.4. AF Form 1806. 2.5. Owner's manual. 2.6. Local procedures.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Multi-purpose sweeper. 2. Personal protective equipment. 3. General tool kit. 4. Gutter broom bristles.
Learning Objective:	The trainee will be able to properly change and adjust a gutter broom on a multipurpose sweeper.
Samples of Behavior:	The trainee will demonstrate how to change and adjust a gutter broom on a multipurpose sweeper.
Notes:	
<ol style="list-style-type: none"> 1. Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety goggles). 2. Any safety violation is an automatic failure. 	

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CHANGE BROOMS / MAKE ADJUSTMENTS TO BROOM

1. Background.

1.1. The TYMCO gutter broom system is designed for effectiveness and ease of service. Use caution when working around gutter brooms since bristles can cause serious cuts and punctures. The only adjustments the operator should be concerned with are the angle, tilt, and spring adjustment. Angle refers to adjusting the broom from front to rear. Tilt refers to adjusting the broom left to right. The spring adjustment dictates the amount of down pressure applied. All three adjustments affect the sweeping pattern of the gutter broom bristles. Always make adjustment on level area.

1.2. The sweeping pattern for the gutter broom bristles must be adjusted to gutter conditions on your particular base. However, for most applications you should adjust the left broom to the 9 and 2 o'clock position and the right broom to the 10 and 3 o'clock position. Typically, these adjustments properly position the bristles for effective cleaning.

SAFETY:

- 1. DO NOT SERVICE GUTTER BROOM ASSEMBLY WHILE IT IS ENGAGED AND ROTATING.**
- 2. ENSURE AREA IS CLEAR BEFORE LOWERING OR RAISING THE GUTTER BROOM.**
- 3. DO NOT STEP OR STAND ON THE GUTTER BROOM.**

2. Broom Procedures. Follow these steps to perform these tasks:

2.1. Change Broom. Replace broom bristles when worn down to 5 inches or less in length.

Step 1: Lower gutter broom, place gutter switch to neutral and turn off engine.

Step 2: Remove bolts from one broom segment at a time.

Step 3: Replace broom segment and reinstall bolts and tighten.

Step 4: Repeat action until all segment are replaced.

IMPORTANT:

The spring eyebolt nut must be re-tensioned when a new set of bristles are installed. Failure to do so will result in rapid wear of the new bristles.

2.2. Adjustments to Broom.

Step 1: Adjust spring.

1.1. A heavy-duty spring is used for gutter broom down pressure and compensating for bristle wear.

1.1.1. For normal conditions, set the gutter broom down pressure with the broom in the neutral position.

1.1.2. Tighten or loosen the nut on the spring eyebolt so the broom bristles are from 1 to 2 inches above the ground.

1.2. The spring eyebolt nut is also used to adjust the gutter broom for bristle wear. As bristles are worn, loosen the nut on the spring eyebolt to lower the gutter brooms down so that they are within the 1 to 2 inches above ground requirement.

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Step 2: Prepare gutter broom for adjustment.

- 2.1. With main engine off, start the auxiliary engine and place the gutter broom in the down position.
- 2.2. Once down, place the gutter broom control lever in the neutral position so the broom is not rotating, then turn the auxiliary engine off.

Step 3: Loosen bolts.

- 3.1. There are two $\frac{5}{8}$ -inch bolts behind the hydraulic motor to adjust the angle and four $\frac{5}{8}$ -inch bolts on the side of the boom to adjust the tilt.
- 3.2. These bolts must be loosened to adjust the gutter broom angle and tilt.

Step 4: Adjust broom.

- 4.1. Once the bolts are loose, adjust the broom for the desired tilt by pushing down on the outside edge of the gutter broom plate.
- 4.2. Then tighten the four $\frac{5}{8}$ -inch bolts to hold the pattern.

Step 5: Adjust angle bracket.

- 5.1. To reduce the angle or flatten the gutter broom pattern, follow the same procedure for loosening the gutter broom angle bracket.
- 5.2. Lift up on the outside edge of the gutter broom plate to reduce the angle as desired and then tighten the two $\frac{5}{8}$ -inch front bolts.

**REVIEW QUESTIONS
FOR
CHANGE BROOMS / MAKE ADJUSTMENTS TO BROOM**

QUESTION	ANSWER
1. For most gutter sweeping operations, what is the normal adjustment for the left gutter broom?	a. 9 and 1 o'clock. b. 9 and 2 o'clock. c. 10 and 2 o'clock. d. 10 and 3 o'clock.
2. When in the neutral position, a properly adjusted gutter broom spring eyebolt is tightened or loosened so the bristles are ____ to ____ inches above the ground.	a. 1 to 2 b. 1to 3 c. 2 to 3 d. 2 to 4
3. The Gutter Broom should be replaced when the bristles are ____ or less in length.	a. 3" b. 4" c. 5" d. 6"
4. There is never a situation in which the gutter broom assembly should be serviced while it is engaged and rotating.	a. True. b. False.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

CHANGE BROOMS / MAKE ADJUSTMENTS TO BROOM

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....	YES	NO
Change Broom		
1. lower the broom and shut off engine?		
2. replace one broom segment at a time?		
3. tighten bolts?		
4. comply with all safety requirements?		
Adjust Broom		
1. correctly adjust spring?		
2. correctly prepare gutter broom for adjustments?		
3. loosen bolts?		
4. correctly adjust broom to proper setting?		
5. correctly adjust angle brackets to proper setting?		
6. comply with all safety requirements?		

FEEDBACK: Trainer/Certifier should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer/certifier.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.



MULTI-PURPOSE SWEEPERS

MODULE 19

AFQTP UNIT 3

CHANGE WEARING SURFACES (19.3.5.)

MAKE ADJUSTMENTS TO HOOD (19.3.6.1.)

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

CHANGE WEARING SURFACES / MAKE ADJUSTMENTS TO HOOD

Task Training Guide

STS Reference Number/Title:	19.3.5. - Change wearing surfaces on multi-purpose sweeper. 19.3.6.1. - Make adjustments to hood on multi-purpose sweeper.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-1, Lesson 013; <i>Operator Adjustment on the TYMCO Air Sweeper</i>. 2. Technical Order (TO) 36C25-2-32-11, TYMCO, MODEL 600, Operators Manual. 3. Air Force Joint Manual (AFJMAN) 24-306, Manual for the Wheeled Vehicle Driver. 4. AF Form 1806, Operator's Inspection Guide and Trouble Report (Aircraft Towing, Base Maintenance Deicers, High Reach and Snow Removal). 5. Owner's manual. 6. Local procedures.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess a minimum of a 3E231 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-1, Lesson 013. 2.2. TO 36C25-2-32-11. 2.3. AFJMAN 24-306, Chapter 1, page 1-6; <i>Driver Responsibilities</i>. 2.4. AF Form 1806. 2.5. Owner's manual. 2.6. Local procedures.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Multi-purpose sweeper. 2. Personal protective equipment. 3. General tool kit. 4. Hood replacement parts.
Learning Objective:	The trainee will be able to properly change wearing surfaces and make adjustments to the hood on a multi-purpose sweeper.
Samples of Behavior:	The trainee will demonstrate how to change the wearing surfaces and make adjustments to the hood on a multi-purpose sweeper.
Notes:	
<ol style="list-style-type: none"> 1. Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection and safety goggles). 2. Any safety violation is an automatic failure. 	

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

CHANGE WEARING SURFACES / MAKE ADJUSTMENTS TO HOOD

1. Background.

1.1. As the sweeper operator, you are responsible for changing the wearing surfaces on the sweeper. The wearing surfaces are designed to protect the overall condition of the sweeper. If they wear down too far, the pickup head or gutter brooms may be damaged. To prevent any damage, you need to replace the curtains and skid plates on the pickup head and the bristles on the gutter brooms as recommended by the owner manual.

1.2. If the pick-up head and gutter brooms are not properly adjusted, sweeping efficiency will suffer and cost the Air Force money. Therefore, the sweeper operator is responsible for making the appropriate adjustments.

NOTE TO TRAINER/CERTIFIER:

For the trainee to complete these tasks, provide trainee with additional manpower to remove the pick-up head (Change Wearing Surfaces, step 2) and perform one-hand lift test (Adjustment to the Hood, step 11).

2. Change and Adjustment Procedures. Follow these steps to perform these tasks:

2.1. Change Wearing Surfaces on a Multi-purpose Sweeper.

Step 1: Ensure sweeper is properly parked. Should be parked on a level surface.

Step 2: Remove the pickup head from the sweeper.

2.1. Start the auxiliary engine and raise the pickup head.

2.2. Shut off the engine and remove the flotation springs (put each clevis in the chain-link it was removed from).

2.3. Start the auxiliary engine and lower the pickup head.

2.4. Shut off the engine again, then remove the following:

2.4.1. Pressure and suction tubes, lift chains, drag links, center debris deflector curtain, pressure bleeder cable, and water line.

2.4.2. Put all pins, bolts and screws back on the parts so they do not get lost.

2.5. Pull the pickup head out from under the left side of the sweeper and turn it upside down to work on the bottom.

NOTE:

Additional help will be needed to move the pickup head due to the excessive weight.

Step 3: Remove the curtains.

3.1. Pay particular attention to the placement of the angle brackets (they MUST be put back in the same position later).

3.2. Remove the self-tapping screws and inspect them for wear. Replace the screws if necessary.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

- 3.3. Remove the curtains. There are six of them:
- 2.3.1. Front 10-inch (254mm) light curtain.
 - 2.3.2. Front 10-inch (254mm) heavy curtain.
 - 2.3.3. Suction baffle curtain.
 - 2.3.4. Two each rear 8 inch (203.23mm) curtains.
 - 2.3.5. Blast orifice curtain.

NOTE:

Curtain settings will be different for other types of TYMCO pick-up heads, refer to owner manual for proper setting.

Step 4: Replace the curtains.

- 4.1. Replace all curtains with the thick rubber part of the curtain pointed toward the front and the cords toward the rear of the pick up.
- 4.2. Use new self-tapping screws if the old ones are worn down too far.

Step 5: Replace skid plates (if necessary).

- 5.1. Inspect skid plates.
 - 5.1.1. Replace if $\frac{1}{4}$ " or less of skid plate runner remains.

Note:

Check with manufacture if using other types of skid plate for replacement requirements.

- 5.1.2. Replace if there is uneven wear on front or back of the skid plate runner.
- 5.1.3. Replace if there damage to skid plate and proper adjustment cannot be made as required.
- 5.2. Remove the bolts on the side of the pickup head to remove the skid plates.
- 5.3. Install new skid plates and retighten the bolts per owner manual.

2.2. Adjustment to the Hood.

Step 6: Make adjustments as needed.

- 6.1. Measure and adjust the blast orifice, blast orifice skid guards, and the skid plates.
 - 6.1.1. The most critical adjustment on the pickup head is the blast orifice opening.
 - 6.1.2. The blast orifice opening on the pick-up head directs the high velocity air from the blower. Use owner manual for proper adjustment.

NOTE:

Failure to adjust blast orifice as required will result in reduced velocity and poor sweeping performance!

- 6.2. There are two blast orifice skid guards that prevent damage to the blast orifice gap.
 - 6.2.1. Use owner manual for minimum distance allowed between the bottom of the blast orifice skid guards and the bottom of the skid plates.

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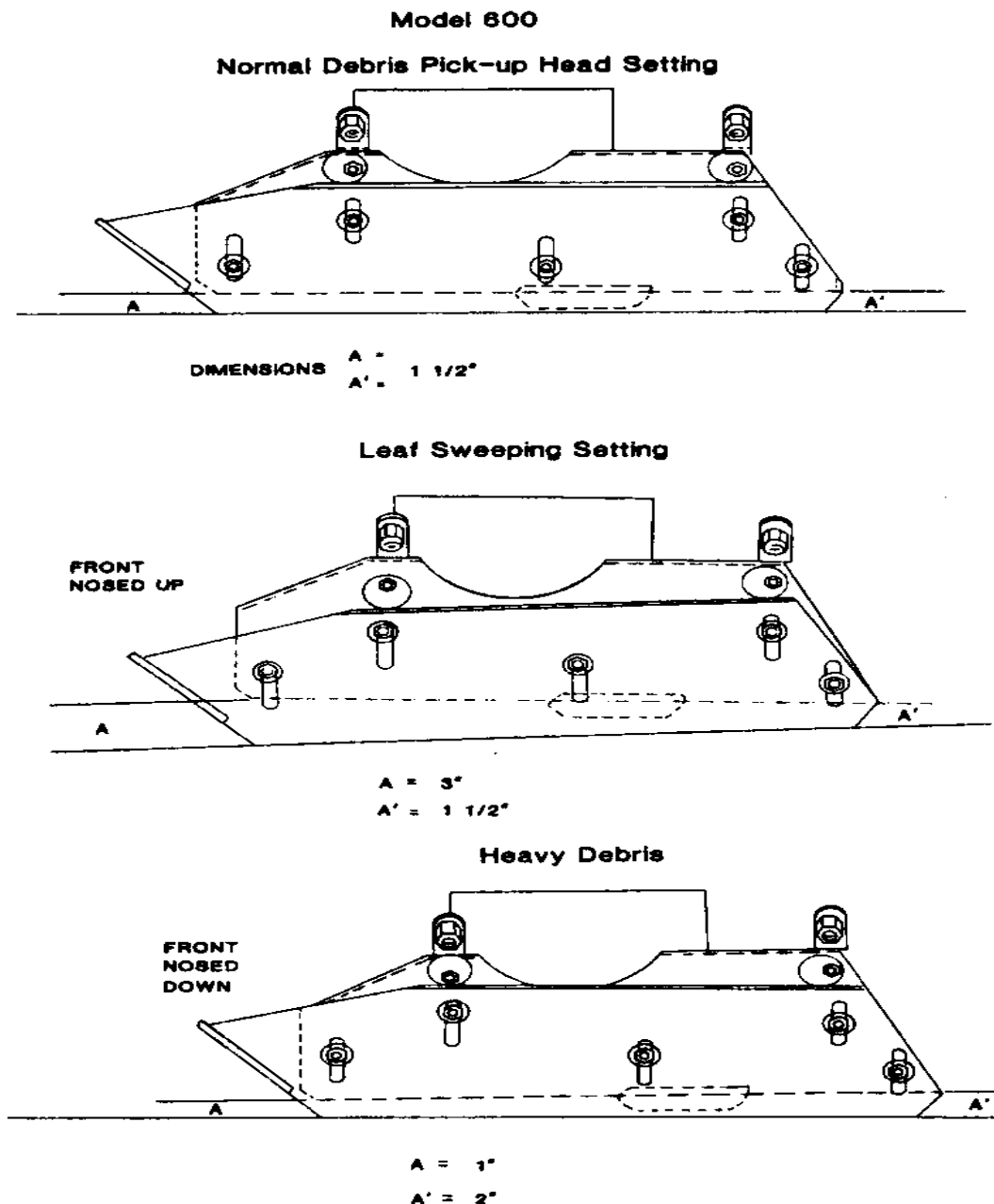
6.2.2. The blast orifice skid guards are welded into place; therefore, the skid plates must be adjusted to ensure the correct spacing.

6.2.3. To adjust the skid plates, loosen the five bolts on each side of the pick-up head.

6.2.4. The skid plate runners must be set level with each other. The skid plates can also be adjusted to handle all types of debris (Figure 19-1).

6.2.5. To change the pickup head debris setting, adjust the skid plates to achieve the desired tilt for type of debris.

Figure 19-1. Skid Plate Adjustment Diagram.



Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

Step 7: Reassemble pickup head on the sweeper.

- 7.1. Turn pickup head over and slide under the left side of the sweeper.
- 7.2. Reconnect the water line, pressure bleeder cable, center debris deflector curtain, drag links, and lift chains.
- 7.3. Start the auxiliary engine and raise the pickup head.
- 7.4. Shut off auxiliary engine; reconnect pressure, suction tubes and pressure bleeder cable.

Step 8: Adjustment to pickup head.

- 8.1. Start the auxiliary engine and lower pickup head and shut off auxiliary engine.
- 8.2. Perform rocker test.
 - 8.2.1. Standing on one side of the sweeper, reach down and grab the front and rear of the pickup head and try to rock it.
 - 8.2.2. If the skid plates are not properly adjusted it will rock.

Step 9: Make adjustments to the left skid plate only.

- 9.1. Make adjustments if necessary. Then perform test again.
- 9.2. If it no longer rocks, move on to the next step, otherwise make additional adjustments until it no longer rocks.

Step 10: Raise pickup head and reconnect flotation springs.

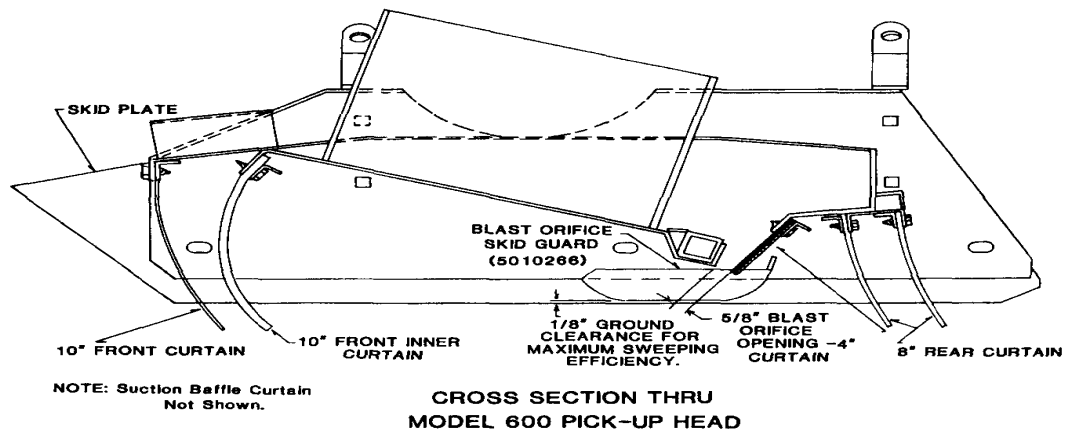
NOTE:

Additional help will be needed to move the sweeper forward while the trainee perform lift test.

Step 11: Perform one-hand lift test.

- 11.1. With the truck moving forward slowly, the pickup head lowered, and the auxiliary engine running per owner manual, try to lift the left front corner of the pickup head.
 - 11.1.1. Should be able to lift it easily, with very little effort.
 - 11.1.2. If not, adjust the flotation springs by loosening or tightening the eyebolts.
 - 11.1.3. If adjustments are made, perform one hand lift test again.
- 11.2. If the front of the skid plate is nose-diving, causing the rear of the skid plate to pick up, more front spring tension is needed.
- 11.3. For minor adjustments, tighten the spring eyebolt nut.
- 11.4. For major adjustments, change the chain link.
- 11.5. The left front of the pick-up head requires the most spring tension. This is to counter the air blast from the blower motor. As a result, the left front spring has the smallest chain link extension of all the flotation springs.
- 11.6. Once all adjustments are correct, the pickup head should set level with the curtains properly seated (Figure 19-2).

Figure 19-2. TYMCO Air Sweeper Pickup Head Diagram.



NOTE:

When the spring tension is set correctly, the head should ride evenly on the pavement and not leave any white scuffmarks on the pavement. The pick-up head should float slightly above the pavement.

**REVIEW QUESTIONS
FOR
CHANGE WEARING SURFACES / MAKE ADJUSTMENTS TO HOOD**

QUESTION	ANSWER
1. If the pick-up head is not properly adjusted, sweeping efficiency will suffer.	a. True. b. False.
2. How many blast orifice skid guards are used to prevent damage to the blast orifice gap?	a. 2. b. 3. c. 4. d. 6.
3. After all the adjustments to the pickup head have been made, the head should be resting lightly on the pavement.	a. True. b. False.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

CHANGE WEARING SURFACES / MAKE ADJUSTMENTS TO HOOD

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....	YES	NO
Change Wearing Surfaces		
1. correctly remove pick up head?		
2. correctly remove curtains?		
3. correctly replace curtains?		
4. correctly replace skid plates if necessary?		
5. comply with all safety requirements?		
Adjust Hood		
1. make proper adjustments?		
2. correctly reassemble pickup head to sweeper?		
3. perform rocker test?		
4. make additional adjustments to the left skid plate only?		
5. reattach springs and lowered pick-up head?		
6. perform one hand lift test and make necessary adjustments?		
7. comply with all safety requirements?		

FEEDBACK: Trainer/Certifier should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer/certifier.

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.



MULTI-PURPOSE SWEEPERS

MODULE 19

AFQTP UNIT 3

PERFORM CLEANING OPERATIONS (19.3.7.)

THIS UNIT IS **OPTIONAL** AND AVAILABLE TO USE AS A LESSON PLAN WHEN TRAINING ON THIS NON-CORE TASK.

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

PERFORM CLEANING OPERATIONS

Task Training Guide

STS Reference Number/Title:	19.3.7. - Perform cleaning operations on multi-purpose sweeper.
Training References:	<ol style="list-style-type: none"> 1. Career Development Course (CDC) Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2-1, Section 2, Lesson 013; <i>Operator Adjustment on the TYMCO Air Sweeper.</i> 2. Technical Order (TO) 36C25-2-32-11, TYMCO, MODEL 600, Operators Manual. 3. Air Force Joint Manual (AFJMAN) 24-306, Manual for the Wheeled Vehicle Driver. 4. Owner's manual. 5. Local procedures.
Prerequisites:	<ol style="list-style-type: none"> 1. Possess a minimum of a 3E231 AFSC. 2. Review the following references: <ol style="list-style-type: none"> 2.1. CDC Pavements and Construction Equipment Operator Journeyman 3E251B, Volume 1, Unit 2, Section 2-1, Lesson 013. 2.2. TO. 36C25-2-32-11. 2.3. AFJMAN 24-306, Chapter 1, page 1-6; <i>Driver Responsibilities</i> and Chapter 15, page 15-1; <i>Inspections.</i> 2.4. Owner's manual. 2.5. Local procedures.
Equipment/Tools Required:	<ol style="list-style-type: none"> 1. Multi-purpose sweeper. 2. Personal protective equipment. 3. Water source. 4. Water hose.
Learning Objective:	The trainee will be able to properly clean a multipurpose sweeper.
Samples of Behavior:	The trainee will demonstrate how to clean the multipurpose sweeper.
Notes:	
<ol style="list-style-type: none"> 1. Personnel are required to wear all personal protective equipment pertaining to each task (i.e. work gloves, hearing protection, and safety glass/goggles). 2. Any safety violation is an automatic failure. 3. This unit is <u>optional</u> and available to use as a lesson plan when training on this non-core task. 	

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

PERFORM CLEANING OPERATIONS

1. Background. Cleanliness is one of most important factor in maintaining a multipurpose sweeper. Each operator must clean the sweeper after every shift. First, the sweeper hopper must be dumped. .

2. Cleaning Procedures. Follow these steps to perform this task:

Step 1: Go to designated dumpsite.

Step 2: Open hopper door while auxiliary engine is running at idle and dump load, then close hopper door.

Step 3: Drive to wash rack. Ensure rack is equipped with an oil-water separator and wash the sweeper.

Step 4: Wash inside of hopper. Open the hopper door and left/right side inspection doors and start cleaning the hopper from the inspection doors with emphasis on the outside of the dust separator door and hopper screen.

Step 4: Open dust separator door and wash.

Step 5: Wash door seals, hopper door, and under the raker plate.

Step 6: Disconnect suction tube from holding straps and wash inside of tube. Ensure you reattach the suction tube.

Step 7: Wash outside of sweeper.

Step 8: Clean the inside of the cab.

8.1. Use cleaning supplies.

8.2. **DO NOT** spray water inside the cab.

Step 9: Park sweeper.

9.1. If driving from the wash rack to parking area the hopper needs to be almost closed so that other vehicles can see your rear lights.

9.2. Park the sweeper with hopper and inspection doors open so the seals will dry and regain their shape.

9.3. Make sure that the pickup head was lowered and the sweeper driven forward to properly seat the curtains.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

**REVIEW QUESTIONS
FOR
PERFORM CLEANING OPERATIONS**

QUESTION	ANSWER
1. In maintaining a multipurpose sweeper, when must the operator clean it?	a. Daily. b. Weekly. c. Monthly. d. After each shift.
2. The hopper door will open with power supplied by the drive engine.	a. True. b. False.
3. When cleaning the multipurpose sweeper, what items should be washed?	a. Door seals. b. Raker plate. c. Hopper door. d. All of the above.
4. When parking the sweeper after cleaning, lower the pickup heads and then drive forward slightly to properly seat the curtains.	a. True. b. False.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

PERFORM CLEANING OPERATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE....	YES	NO
1. drive to designated dump site and emptied hopper?		
2. drive to wash rack?		
3. wash inside of hopper?		
4. open dust separator door and washed?		
5. washed door seals, hopper door, and under raker plate?		
8. make proper adjustments?		
9. disconnect suction tube and wash inside of tube?		
10. wash outside of sweeper?		
11. left hopper door and inspection doors open?		
12. comply with all safety requirements?		

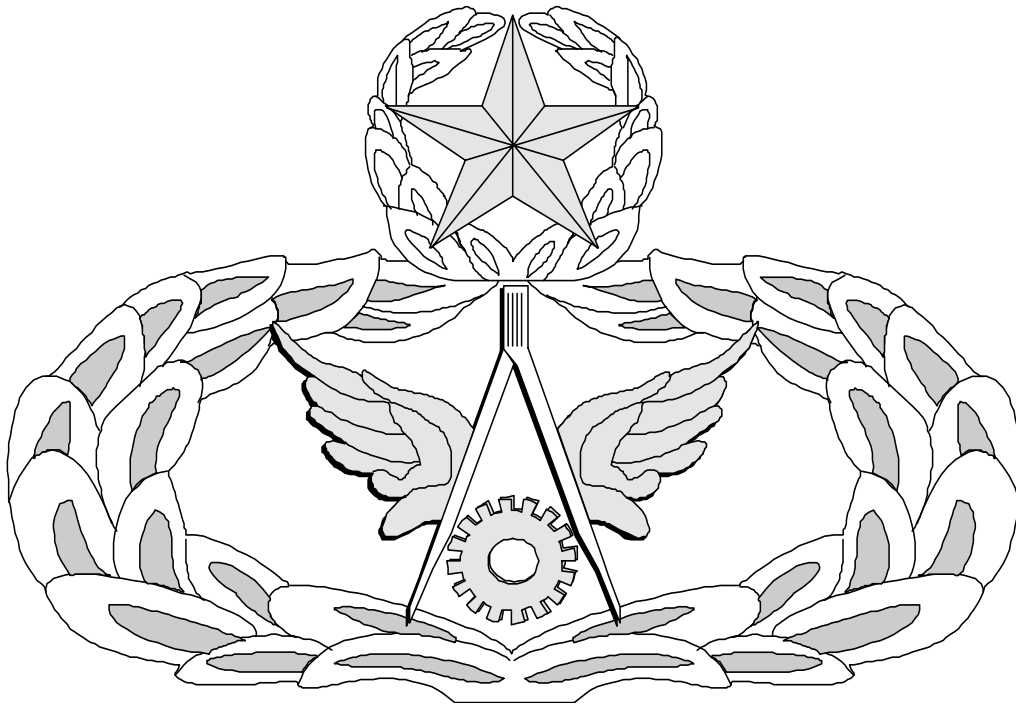
FEEDBACK: Trainer/Certifier should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer/certifier.

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

Air Force Civil Engineer

QUALIFICATION TRAINING PACKAGE (QTP)

REVIEW ANSWER KEY



FOR

PAVEMENTS & CONSTRUCTION EQUIPMENT OPERATOR

(3E2X1)

MODULE 19

SWEEPERS

Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training if equipment is available. It is to be used in conjunction with these for training purposes only.

Key-1

**PERFORM OPERATIONAL CHECKS AND OPERATOR MAINTENANCE ON MULTI-PURPOSE SWEEPERS
(3E2X1-19.3.1. & 19.3.2.)**

QUESTION	ANSWER
1. The drive belt inspection is required on the drive engine only.	a. True.
2. Which of the following is not an inspection item performed in both the drive and auxiliary engine compartments?	d. Brake fluid.
3. Which AF Form is the vehicle inspection guide that should be used to inspect the multipurpose sweeper?	d. AF Form 1806.
4. The gutter brooms should be inspected for wear and adjustment during the pre-operational inspection.	a. True.

**OPERATE ON STREET
(3E2X1-19.3.2.2.)
OPTIONAL**

QUESTION	ANSWER
1. What is the first step in sweeping operations?	a. Pre-operational check.
2. Never use the water system when sweeping if weather is _____?	c. freezing.
3. How long must you allow the auxiliary engine to idle before shutting down?	c. 3 to 5 min.
4. Safety flashers and beacon must be on when traveling in the sweeper.	a. True.

**CHANGE BROOMS / MAKE ADJUSTMENTS TO BROOM
(3E2X1- 19.3.4. & 19.3.6.2.)**

QUESTION	ANSWER
1. For most gutter sweeping operations, what is the normal adjustment for the left gutter broom?	b. 9 and 2 o'clock.
2. When in the neutral position, a properly adjusted gutter broom spring eyebolt is tightened or loosened so the bristles are ___ to ___ inches above the ground.	a. 1 to 2
3. The Gutter Broom should be replaced when the bristles are _____ or less in length.	c. 5"
4. There is never a situation in which the gutter broom assembly should be serviced while it is engaged and rotating.	a. True.

**CHANGE WEARING SURFACES / MAKE ADJUSTMENTS TO HOOD
(3E2X1-19.3.5. & 19.3.6.1.)**

QUESTION	ANSWER
1. If the pick-up head is not properly adjusted, sweeping efficiency will suffer.	a. True.
2. How many blast orifice skid guards are used to prevent damage to the blast orifice gap?	a. 2.
3. After all the adjustments to the pickup head have been made, the head should be resting lightly on the pavement.	b. False.

**PERFORM CLEANING OPERATIONS
(3E2X1- 19.3.7.)
OPTIONAL**

QUESTION	ANSWER
1. In maintaining a multipurpose sweeper, when must the operator clean it?	d. After each shift.
2. The hopper door will open with power supplied by the drive engine.	b. False.
3. When cleaning the multipurpose sweeper, what items should be washed?	d. All of the above.
4. When parking the sweeper after cleaning, lower the pickup heads and then drive forward slightly to properly seat the curtains.	a. True.

MEMORANDUM FOR HQ AFCESA/CEOF
139 Barnes Drive Suite 1
Tyndall AFB, FL 32403-5319

FROM:

SUBJECT: Qualification Training Package Improvement

1. Identify module.

Module # and title _____

2. Identify improvement/correction section(s):

_____ STS Task Reference	_____ Performance Checklist
_____ Training Reference	_____ Feedback
_____ Evaluation Instructions	_____ Format
_____ Performance Resources	_____ Other
_____ Steps in Task Performance	

3. Recommended changes--use a continuation sheet if necessary.

4. You may choose to call in your recommendations to DSN 523-6074 or FAX DSN/Commercial 523-6488 or (850) 283-6488 or email ceof.helpdesk@tyndall.af.mil.

5. Thank you for your time and interest.

YOUR NAME, RANK, USAF
Title/Position